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Interactive comment on “Variation of particle number size distributions and chemical compositions at the urban and downwind regional sites in the Pearl River Delta during summertime pollution episodes” by D. L. Yue et al.

Anonymous Referee #2

Received and published: 23 August 2010

General Comments:

This manuscript reports the continuous measurements of particle number size distribution and chemical composition at an urban site and a downwind receptor site in the Pearl River Delta (PRD). The discussion focuses on two kinds of pollution episodes including the accumulation pollution episode and the regional transport pollution episode. This study provided valuable dataset for the PRD region. The authors need to point out the importance of studying particulate episode (as defined as PM_{2.5} exceeding 100 $\mu\text{g}/\text{m}^3$ for more than 2 hours) in PRD since summer is the season when PM level

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is the lowest or state the original objectives of this study more clearly. It is also important to explain the difference between the accumulation pollution episode and the regional transport pollution episode. It would be helpful if the authors can add a short paragraph summarizing the difference between these two types of episodes.

Specific Comments:

1) P14615, Line 1-3: In fact, fine particle issue is more serious during other seasons than summer. 2) P14616, Line 8: In Table 1, the size range of APS in Guangzhou is 660nm-10 μ m while it is between 15nm to 10 μ m here. 3) P14616, Line 15: At the BG site, particle size ranges from 3nm-10 μ m. Why does the particle size measurement at the Guangzhou site begin with 15nm instead of 3nm? The data have clearly shown that the Guangzhou site is apparently influenced by traffic emissions. 4) P14618, Line 15-17: Based on the difference of peak size (2 μ m at BG vs. 3 μ m at GZ), the authors suggest their major sources of coarse particles are different. State reasons and specify sources of coarse particles at GZ and BG so that their difference can be more apparent. 5) P14618, Line 20: The mean PM_{2.5} mass concentration is comparable at both sites. However, it varies widely as can be seen from its standard deviation (69 \pm 43 at GZ and 69 \pm 58 at BG). Based on the similar mean values, the authors suggest that PM pollution in PRD is a regional problem. Do PM concentrations at these two sites are positively correlated or is it just their mean values are comparable? 6) P14620, Line 1: CO and EC kept increasing gradually. As can be seen from Figure 3, EC is enriched in PM of this episode (about 20-30% around 6:00 on July 12). Is it possible that increased emissions from some specific sources (e.g., traffic emissions) contribute to this episode? If only accumulation took place under stagnant meteorological conditions, the relative mass percentage of each major constituent should be similar between episodic and non-episodic samples at this site. However, it seems that the relative proportion of PM composition changes over time (see Figure 3). 7) P14621, Line 7: Wind switches between southerly and easterly. What about the influence from easterly? It seems that BG site is not solely impacted by the GZ site. 8) P14621, Line

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12: “The average size distributions of SO₄²⁻ and NH₄⁺ on 21 July... (Fig. 7b)”. Figure 7a does not show data of 19 July and Figure 7b does not present NH₄⁺ data.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 14611, 2010.

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